

Claims

1. Slips comprising :
 - (i) a slips bowl seatable in a table
 - 5 (ii) a plurality of pipe-gripping slips disposed in the slip bowl for radial movement therein
 - (iii) a moving means for moving the slips radially whereby the moving means moves the slips into or out of contact of a tubular located within said bowl at about substantially ninety degrees to the tubular.
- 10 2. Slips as claimed in claim 1 in which the moving means comprises a wedge which contacts a sloping external surface of the slips whereby moving the wedge over the said sloping surface causes radial movement of the slips.
- 15 3. Slips as claimed in claim 2 in which there is a wedge moving means which can apply a force to the wedge to move it over the surface of the slips.
4. Slips as claimed in claim 2 in which there are a plurality of wedges between the wedge moving means and the slips with a first wedge in contact with the sloping surface of the slips and an adjacent wedge in contact with the first wedge.
- 20 5. Slips as claimed in claim 2 in which there are two wedges with the first wedge in contact with the sloping surface of the slips and an adjacent wedge in contact with the first wedge and the wedge moving means and in which the first wedge is a coarse wedge and the second wedge is a fine wedge.
- 25 6. Slips as claimed in claim 5 in which there is a spring located between the first and second wedges.

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7. Slips as claimed in claim 5 or 6 in which there are ridges on the coarse wedge, such that no acting friction slope within the slips assembly is at more than about 10 degrees to the axis of the tubular.
- 5 8. Slips as claimed in any one of claims claim 2 to 7 in which there is a link, with one end pivotally attached to the slips and the other end fixed, whereby the slips are substantially constrained by the link to move substantially at ninety degrees to the tubular at the moment of contacting or retracting from the tubular.
- 10 9. Slips as claimed in any one of the preceding claims in which the slips bowl is segmented and contained within an upside-down wedge shaped or conical bowl such that the movement of the inner segmented bowl, within the outer wedge shaped or conical bowl, allows the slips to accommodate a range of diameters of drill strings, tubulars and tool joints.
- 15 10. Slips as claimed in any one of the preceding claims in which there is a second set of slips that interfere with the shoulder of the tool joint such that, once applied or set, take the axial force and provide the support for the drill string weight.
- 20 11. Slips as claimed in any one of the preceding claims in which the slips bowl is a wedge shaped bowl into which the slips are wedged and the bowl moves axially, in parallel with the drill string axis, while the drill string, tubular or tool joint remains static and the slips are forced into contact with the said drill string, tubular or tool joint with little or no relative motion in the direction of the axis of the drill string.
- 25 12. Slips as claimed in any one of claims 6 to 11 in which the wedge shaped bowl and slips are forced together by a mechanical, hydraulic, pneumatic or electrical force so that the minimum gripping force between the slips and the drill string, tubular or tool joint can be predetermined and the gripping force does not rely on the weight of the drill string to drag the slips into the bowl.
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13. Slips as hereinbefore described with reference to the drawings.